

ON A NEW METHOD  
OF  
MANAGING FRACTURES,

FROM THE  
ADDRESS IN SURGERY,

DELIVERED AT THE

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ON A

## NEW METHOD OF MANAGING FRACTURES.

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So much has been written on the subject of fractures that it might appear a work of supererogation to say anything further respecting them; but, notwithstanding all that has been said and done, constant experience demonstrates that the mode of treating them yet admits of much improvement, and I believe, that whilst there is no lack of skill on the part of the profession, *a defective state of apparatus* often baffles the best endeavours of the surgeon to ensure a good and straight limb.

My attention was first drawn to the consideration of fractures, and more particularly those of the thigh, in consequence of a conversation which took place between one of the most eminent surgeons in London, and the late Mr. Tuckwell, when the former acknowledged that in whatever way he treated them, he could not ensure that the limb would not be shortened. This was before the long splint, (as improved by the late Mr. Liston,) had come into such general use. Under his mode of treatment, a limb of the proper length may be pretty surely depended on, but I think it is open to serious objections, and is certainly not applicable to all cases.

It is not my intention to consider the whole of the treatment of fractures, but to describe the different forms of apparatus which I have invented, and which I believe best calculated to supply the place of the surgeon's hands, and those of his assistants, when they have been removed.

From the ease with which, in general, a fractured limb is reduced and brought into a proper position, one would be led to suppose that the treatment of fractures was a very simple business; but how frequently does it happen, that after a surgeon has reduced



one, and left the limb in the best possible position, he discovers on his next visit, one end of the bone riding over the other; and when union has taken place, the patient is mortified and the surgeon disgraced, by a shortened and deformed limb. This can only result from defective apparatus.

Mr. Pott, in treating of fractures, says:—"The general doctrine relative to them is contained under the following heads:—

Extension.	Delegation or Bandage.
Counter Extension.	Position.
Coaptation, or Setting.	Prevention or Relief of Accidents."
Application of Medicaments.	

Now, it appears to me that we have to attend first to position, without which, we shall in vain hope to be successful in our treatment of fractures. Extension and counter extension are the next points of importance, and that, in my opinion, is but an imperfect apparatus, by which they are not effected. What is done by the splints in ordinary use? They merely give side support, and afford us no means of keeping up the extension of the limb to which they are applied. And what is a common result? A riding of the bone, and a shortening of the limb. For the first few days after a fracture, there is generally considerable spasm of the muscles, and after that has ceased, a tonic contraction of them. Should the fracture be transverse, the bone will be bent; if oblique, the ends will ride over one another; and in either case deformity will ensue.

I shall briefly notice the means which are ordinarily in use, and first, as to the treatment of fractures of the thigh, which are unquestionably those which result so frequently in deformity, and as the straight position with the long splint is now most commonly in use, I shall begin with it. As I before said, it will certainly ensure a proper length of limb, but the objections to its use are, first, that the position is an unnatural and an uncomfortable one, and I do not know that I can do better than quote Mr. Pott's words relative to it. After speaking of fractures of the humerus, and expatiating on the small amount of trouble and pain, and the slight extension which is requisite in the treatment of them, he says:—"Is it not because both patient and surgeon concur in putting the arm in a state of flexion, that is in such a state as

relaxes all the muscles surrounding the broken bone, &c.” “Apply,” says he, “the same reasoning to the os femoris, that bone whose fracture so often lames the patient, and disgraces the surgeon. “Will it not be more cogent and more conclusive, in proportion as the muscles in connexion with this bone are more numerous and stronger? I would ask any man who is conversant with accidents of this kind, what is the posture which almost every person whose os femoris has been newly broken puts himself into, in order to obtain ease, until he gets proper assistance? Do such people stretch out their limb and place their leg and thigh straight, resting on the calf and heel? I believe seldom or never. On the contrary, do not such people always bend their knee, and lay the broken thigh on the outside? And is not the reason why this must be the most easy posture obvious?”

I would ask, moreover, what is the position which most people assume when they lie in bed without a broken bone? Do they not generally flex the thigh on the trunk, and the leg on the thigh? The reason is clear; it is the most comfortable position.

In the straight position, however, provided the fracture be in the middle of the bone, you may generally expect to get a very good and serviceable limb, provided the splint be well applied, and the case carefully attended to; but, should the fracture be the upper-third of the bone, the result will not always be so satisfactory. The *psoas magnus* and *iliacus internus* have a tendency to elevate the bone and rotate it out, whilst the other large muscles arising from the pelvis, and attached to the outer part of the femur, tend to abduct it. Thus, though the limb may not be shortened, the ends of the bone will not be in a good state of apposition. In fractures near the knee, it is, I think, likewise objectionable; for when the limb is placed in a straight position, the *gastrocnemius*, acting strongly, has a tendency to draw the bone down, and thus to produce a degree of deformity causing the upper part to project.

I have recently had a case in which this occurred. The fracture was so near the knee joint that it was very doubtful whether it did not extend into it, and from the swelling which had taken place, an accurate examination could not be made. As it appeared probable that a stiff joint might result, I placed it in a straight position, but on examining it when the swelling had subsided, which was not for some time, the upper part of the bone was found



to be considerably in front of the lower, which was again felt between the outer and inner flexors of the knee. At the end of six weeks, the man was allowed to sit up, and although he did not use the limb, the union, which had apparently taken place satisfactorily, gave way, and he was compelled to undergo another period of confinement to bed. At the end of two months more, the bone was found to be firmly united, but with the same awkward riding, and he had but little motion in the knee. He shortly afterwards left the infirmary, and went to a considerable distance, so that I am not likely to hear anything further respecting him.

Mr. Pott was led to consider that the best position for effecting a good cure was to place the patient on the injured side, the thigh being flexed on the body, and the leg on the thigh, thus affording the greatest degree of relaxation to the muscles. And this would perhaps be as good a mode of treatment as any other, could we ensure our patients constantly remaining in a proper position; but, unfortunately, when so placed, they have a constant disposition to turn towards, if not to lie quite on the back, thus giving a very uncomfortable twist to the limb.

I give a drawing of a fracture which occurred in an old lady suffering under cancer. She was treated by a surgeon of considerable eminence, and when I first saw her, ten weeks after the accident, her position was just what I have described,—the limb was on its side, the patient on her back. I need hardly say that she never afterwards walked upon it. She died about six months after the accident.

I exhibit a front and back drawing of the bone, to show how beautifully Nature worked under the most unfavourable circumstances which could be imagined. The bone was cancellated and brittle, and yet bridges of new bone were thrown out from the sides, effecting a most perfect union. I regret that I did not remove the whole of the bone. (A *Fig. I*) denotes the situation of the linea alba, showing how the limb was twisted, as well as shortened.

Another position found favour with many surgeons—namely, placing the patient on his back, the knee being raised and supported with pillows, and as these were found to be constantly giving way, various means were adopted, by frames, &c., to keep the knee properly elevated, but on the whole this plan was found to be

unsuccessful. Mr. Earle's bed promised to afford the best means of support, and for a considerable time I was disposed to consider that it could hardly fail to ensure a good and straight limb; but on making experiments on it, I found that it was as defective as any other apparatus hitherto in use. It was whilst making my observations on his bed that I made the discovery on which I have based my mode of treatment. Let any one place himself in one of his beds, with the knee elevated to a proper height, and the back likewise elevated, then let the back be raised higher, or be more depressed, and he will find the knee thrust forwards in the one case, and dragged back in the other. A moment's consideration will render any explanation as to this pushing or dragging unnecessary, and it will be quite clear that unless the back be kept always at the same elevation, a good cure cannot be looked for.

On still further making observations, I found that the same pushing and dragging of the limb took place under ordinary circumstances, in changing from a sitting to a recumbent position. Any one may convince himself on this point very easily. Let him sit with his legs straight and his feet touching the wall, and then fall back. He will find in doing so, that his feet are drawn about four inches from the wall. Let him reverse the experiment, and lie down with his feet against the wall, and on rising again into a sitting posture, he will find that his knees will become considerably bent. This effect is very easy of explanation. When sitting, as in the accompanying sketch of the skeleton, (*Fig. II.*) the acetabulum will be found to be above, or rather a little in front of a straight line over the tuber ischii, but on lying down the pelvis, as it were, rolls back, and the acetabulum is consequently carried several inches further backwards. Finding this to be the case, I considered that the best mode of treating fractures of the thigh would be to place the subjects of them on such a bed as would admit of the back being elevated or depressed, without at all interfering with the relative position of the trunk and thigh.

Figure III. shows the bed as it is adapted to a fracture of the middle of the thigh. It will be seen that it has no connexion with the frame on which it rests, except by the hinges at the centre of the bed.

Figures IV., V., and VI., show the extremes to which, when thus



fixed, it is capable of being elevated and depressed, the whole body being moved together.

When the fracture is in the upper-third of the bone, I think it desirable that the limb should be at a right angle with the trunk,\* when, if moderate pressure be made on the outer side of the bone, to antagonize the muscles which tend to abduct it, a straight limb, without any degree of deformity, will be certain to result.

It will be seen that the part of the bed which supports the thigh is capable of being lengthened or shortened, so as to suit patients of any height; the foot-boards are likewise made moveable. *The pelvis being fixed straight in this bed, the knees even with one another, as well as the feet, it is impossible that the fractured limb should come out shortened.*

There is one fracture, namely, of the neck of the thigh, to which my bed is, I think, more than to any other, applicable. And here I protest most strongly against making up one's mind to consider any given case as necessarily incurable, for, with all the rules which have been laid down, no one can say with absolute certainty whether the fracture is within or without the capsule, nor do I think that the impossibility of union, when it is intra-capsular, is by any means established. I do not consider that the means hitherto adopted have afforded a good chance of union, since nothing short of absolute quiet for a great length of time will be sufficient, and if there be a supply of blood adequate to nourish the head of the bone and the detached portion of the neck, I cannot see by what law we are justified in saying that union may not take place. If, on the other hand, the slightest motion be allowed, it cannot be looked for; nor with the fact which I have pointed out, can any mode of treatment be expected to succeed which does not prevent all motion at the hip-joint. Neither in the side position nor on the back, can we possibly expect that a patient

\* Having a patient in the country with fracture of the upper-third of the thigh, where I could not get one of my beds into use, I adopted the following plan:—I placed him on the sound side, and firmly fixed the pelvis by means of towels to the frame of the bed behind him, I then drew the fractured limb directly across the bed, bending the knee likewise at a right angle. Having well bandaged the leg, I fixed other towels to the knee, and fastened them to the bed-frame opposite; the knee and thigh were well supported by pillows. Two splints, applied one on each side of the thigh, kept all things steady, and after union had taken place, it would have been impossible to say which thigh had been broken.



will be content to lie without moving for a period of three months, which is the shortest time I should consider safe. In my bed he may sit up or lie down without danger; indeed, when treated on it, the tediousness of a long confinement to bed is quite got rid of, so constantly may he change from the sitting to the recumbent position. If the bone be kept in exact apposition, I cannot see why the periosteum surrounding the neck may not unite, (nor does it follow that in all cases it must be entirely torn asunder,) and so the head of the bone again derive nourishment from the vessels of the shaft.

I have had two cases in which I have thus treated patients with fracture of the neck of the thigh, under the most unfavourable circumstances, and in which most satisfactory results ensued.

Mr. W. Hemmins, a coachman, was brought home from Woodstock, (where the accident happened,) a distance of eight miles. As there was much swelling, and my patient was a very lusty man, no very satisfactory examination could be made, but the case did not admit of doubt. There was shortening and eversion of the limb, and two surgeons, in whose opinion I placed great confidence, agreed with me as to the nature of the accident. The patient was placed on one of my beds, with the thigh at an angle of about  $105^{\circ}$  with the body, and splints were applied in order to give steadiness to the limb, the foot being fastened to the foot-board. Unfortunately, within a few days, he was seized with a severe attack of rheumatic gout, affecting both the knee and ankle, which compelled me to leave off all apparatus, and trust entirely to position. The rheumatic affection continued for a considerable length of time, but at the end of about three months very firm union was found to have taken place, the limb being shortened exactly half an inch. I did not allow this patient to be raised fully to the sitting position for a considerable time, as I was obliged to leave off all means of fixing the pelvis, and I find that unless that be done, there is a strong disposition to slip forwards when the thigh is brought nearly to a level.

Whilst this patient was under treatment, Thomas Smith, of whose bone I have given a drawing, (*Fig. VII.*) fell on getting off a coach. I saw him shortly afterwards, and the nature of the accident was sufficiently apparent. He was placed on one of my beds, the pelvis was carefully fixed, and proper

extension made and maintained by elongating the middle part of the bed. Shortly after the accident he became deranged, and died at the end of ten weeks of disease of the brain. It was impossible to keep him quiet, and his position was changed from the recumbent to the erect many times daily, nevertheless, when an examination was made, a perfectly firm union appeared to have taken place. I say appeared, for although not the slightest motion could be made between the neck and shaft, it was found after maceration had been carried on for several weeks, that a partial separation had taken place, and this leads me to reiterate my opinion as to the importance of extending the treatment of fracture of the neck of the thigh over a much longer period than is generally allowed for it.

In this case, the fracture was just at the junction of the neck with the shaft of the bone, and would come under the denomination of an extra-capsular one, but in it I cannot but think that with the ordinary means of treatment, the patient having been so restless, it is probable that union would not have taken place, or had it done so, it would have been with a much greater amount of shortening.

With respect to fractures of the leg, I would draw attention to the apparatus of which I give a drawing, (*Fig. VIII.*) which I think cannot fail to afford the greatest facility for effecting a good cure. In making use of it, the knee is first firmly fixed, a pad being placed below the tubercle of the tibia, and another higher up above the head of the fibula, and the foot well strapped to the foot-board, the whole of the limb being supported by bands of webbing, thus, the usual pain and inconvenience from pressure on the heel are avoided; extension is then made by means of the screw underneath, and shortening is effectually prevented. Should there be any disposition to ride, one of the bands may be reversed, and the starting bone fixed in its proper situation, the splints are then screwed on to give side support. It will be seen that it is suspended from rollers, and that it hangs on a centre ring by means of a hook. I originally used a ball and socket joint, but found that the hook and ring afforded quite sufficient motion. The straps being fixed to the under part of the frame allow of the leg being turned, with the whole of the body, to either side, so that my patients with fractured legs have not, for the last year and a half, been compelled to remain in one position.



*Figures IX. and X.* show the instrument turned on the inner and outer sides.

In the treatment of most fractures of the humerus, the instrument *Fig. XI.* will, I think, be most efficient. I consider it essential in the treatment of fractures of this bone, that the arm should be kept fixed to the side, and that no sleeve should be put on till firm union has taken place.

The splint (*Fig. XII.*) will, I think, be found effectual for most fractures of the fore-arm. The common plan of placing the arm on a long flat splint I consider most objectionable.

*Figure XIII.* shows in how uncomfortable a position the arm is placed when a long flat splint is made use of; whilst *Fig. XIV.* demonstrates how much more comfortably it rests when mine is employed. The palm of the hand is received on a rounded projection in the drawing *Fig. XII.*, whilst the thumb rests on the flattened part at its side.

The dotted lines in *Fig. XII.* show that the part of the splint which supports the hand may be turned down for fracture of the carpal end of the radius. I rarely apply two splints in treating fracture of the fore-arm; and I should not omit to add, that in treating all cases of fracture, I fix the extremities of the injured limb to the apparatus before I make extension or any attempt at reduction.





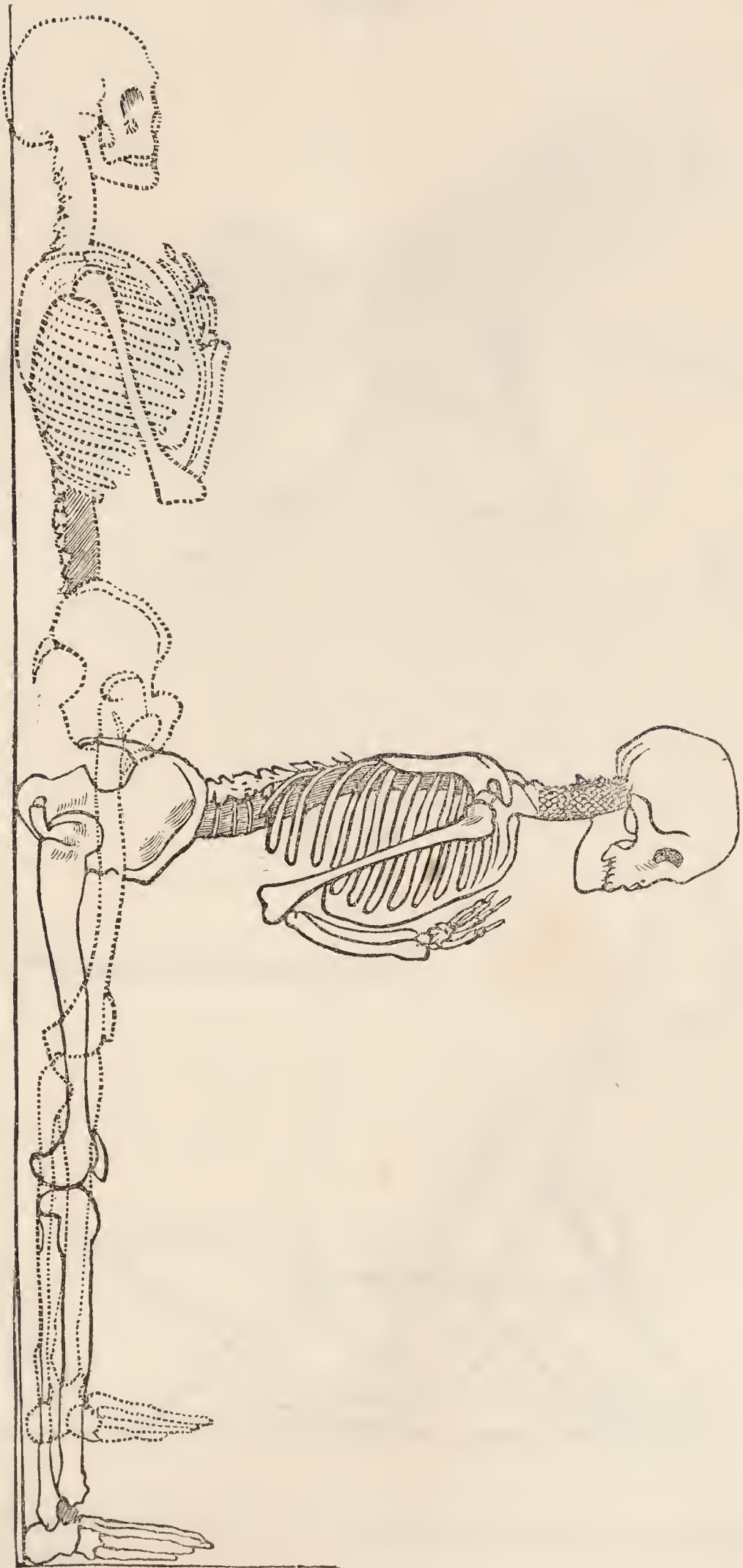
*Fig. I.*



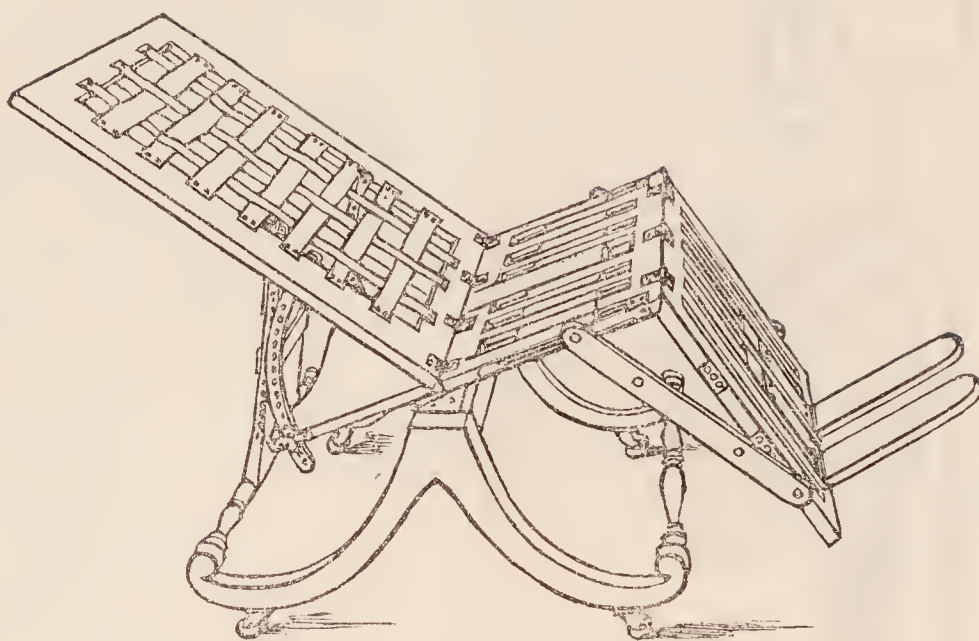




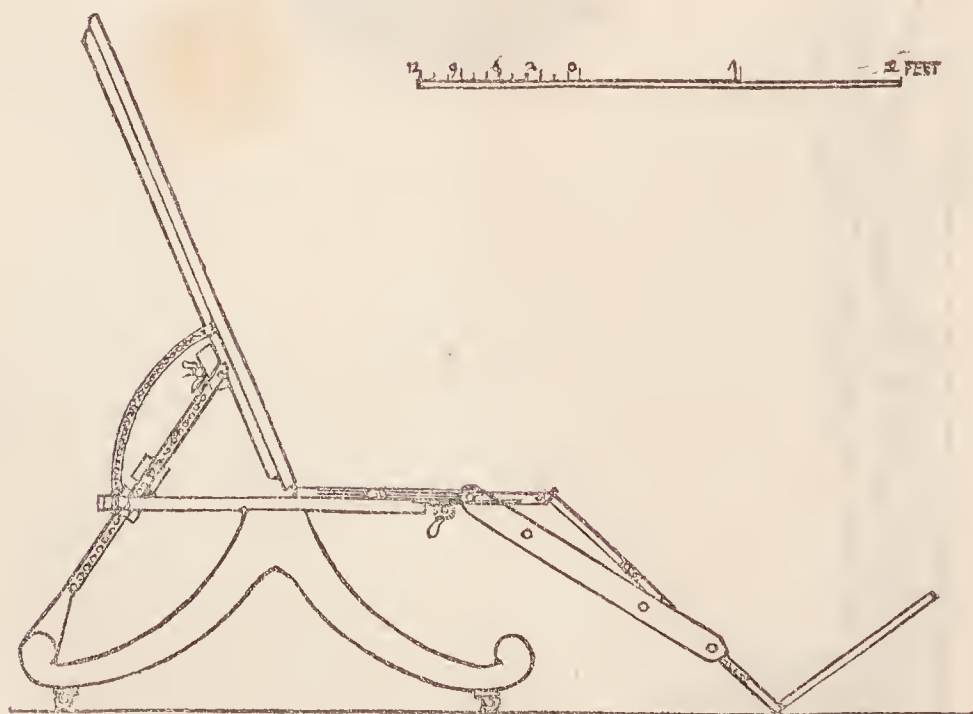
*Fig. II.*



*Fig. III.*

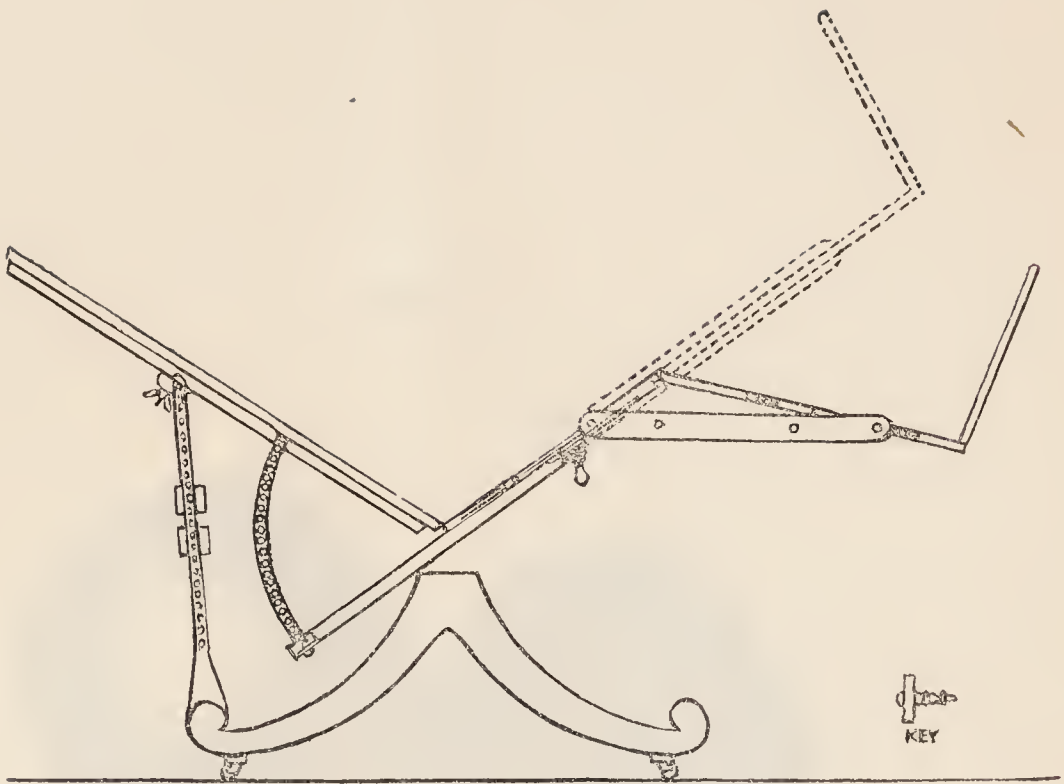


*Fig. IV.*

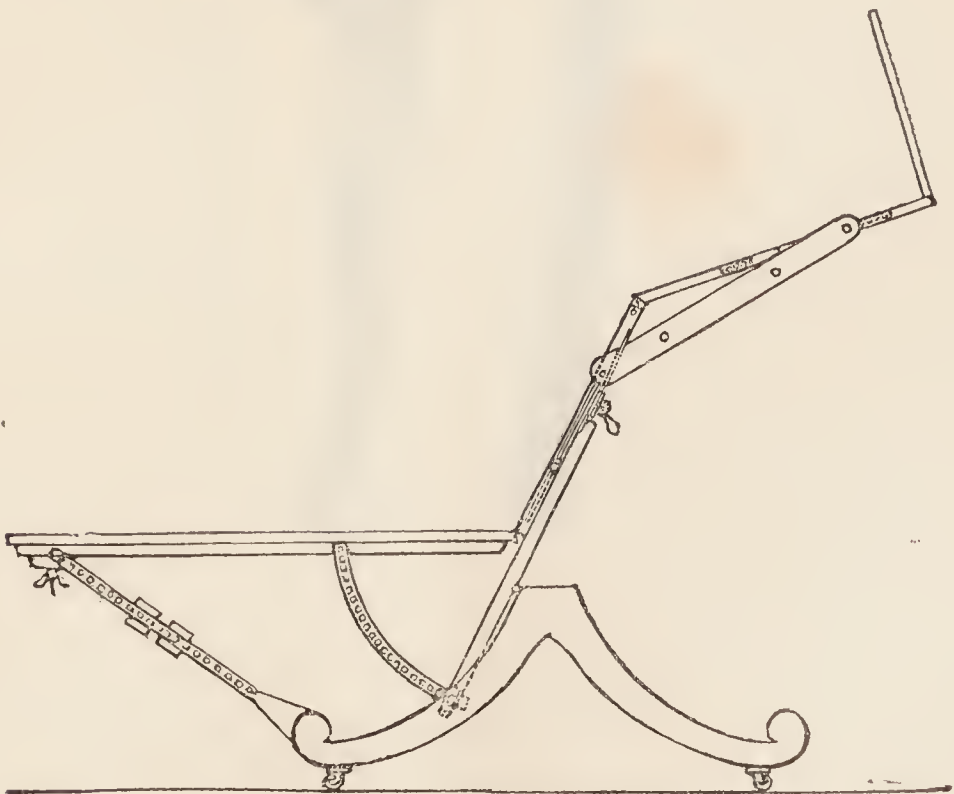




*Fig. V.*



*Fig. VI.*



\* The dotted lines in Fig. V. show the position of the bed when used for fracture of the patella.



*Fig. VII.*









Fig. VIII.

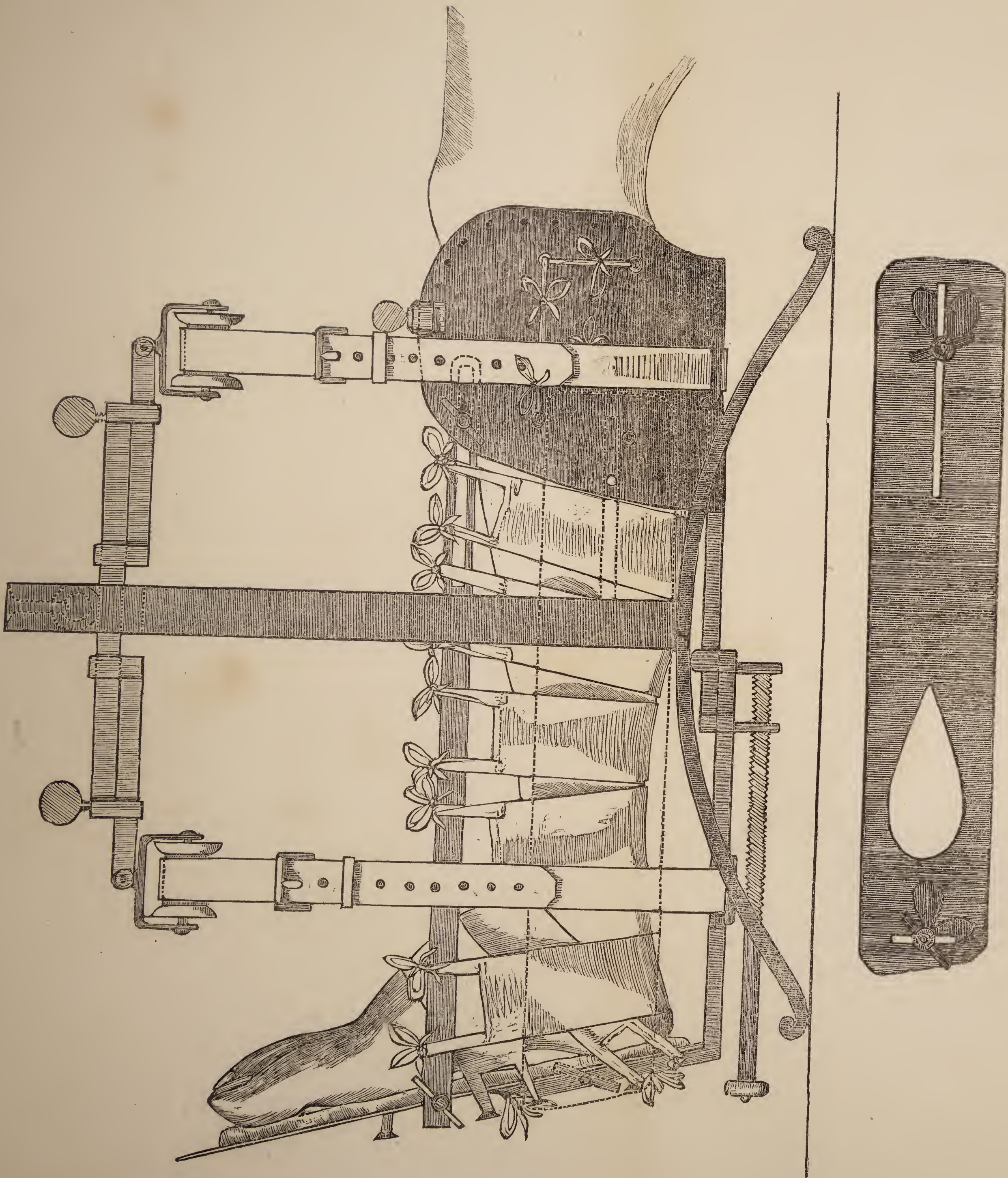
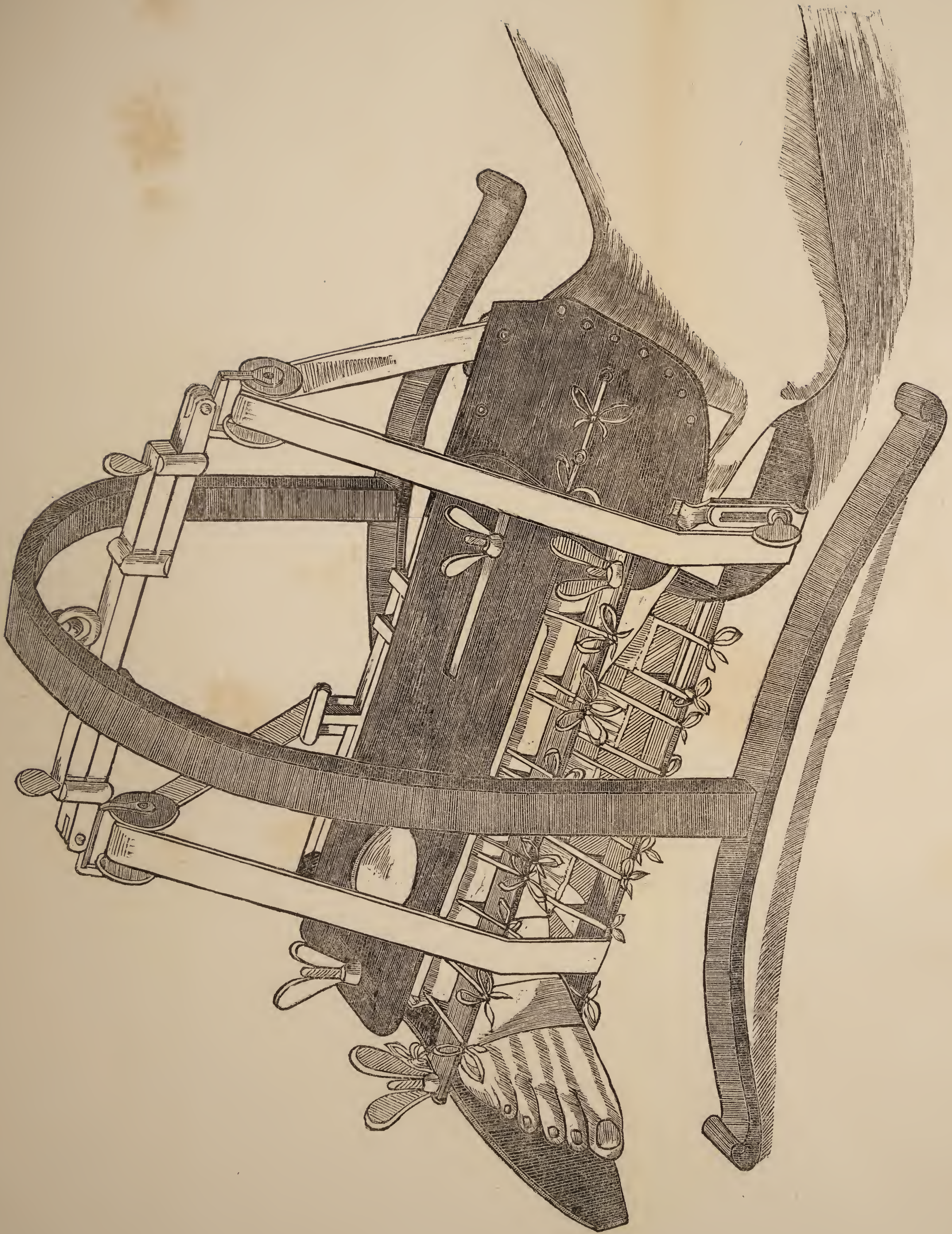








Fig. IX.







*Fig. XI.*

